

Avkhadiev-Becker type p-valence conditions for harmonic mappings of a disc

Nasibullin R., Shafigullin I.

Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2017, Allerton Press, Inc. We obtain Avkhadiev-Becker type p-valence conditions for locally univalent harmonic mappings defined in the unit disc.

<http://dx.doi.org/10.3103/S1066369X17030094>

Keywords

Becker univalence condition, harmonic mapping, multivalence condition

References

- [1] Avkhadiev, F. G., Nasibullin, R. G. Shafigullin, I. K. "Becker Type Univalence Conditions for Harmonic Mappings", Russian Mathematics 60, No. 11, 69-73 (2016).
- [2] Ahlfors, L., Weill, G. "A Uniqueness Theorem for Beltrami Equations", Proc. Amer. Math. Soc. 13, No. 6, 975-978 (1962).
- [3] Becker, J. "Löwnersche Differentialgleichung und quasikonformfortsetzbare schlichte Functionen", J. Reine Angew. Math. 255, 23-43 (1972).
- [4] Becker, J. "Löwnersche Differentialgleichung und Schlichtheitskriterien", Math. Ann. 202, No. 4, 321-335 (1973).
- [5] Avkhadiev, F. G., Aksemt'ev, L. A. "The Main Results on Sufficient Condition for an Analytic Function to be Schlicht", Russ. Mat. Surv. 30, No. 4, 1-63 (1975).
- [6] Avkhadiev, F. G. "Sufficient Conditions for the Univalence of Quasiconformal Mappings", Mat. Zametki 18, No. 6, 793-802 [in Russian].
- [7] Ruscheweyh, S. "An Extension of Becker's Univalence Condition", Math. Ann. 220, No. 3, 285-290 (1976).
- [8] Becker, J., Pommerenke, Ch. "Schlichtheitskriterien und Jordangebiete", J. Reine Angew. Math. 354, 74-94 (1984).
- [9] Avkhadiev, F. G. "Admissible Functionals in Injectivity Conditions for Differentiable Mappings of n-Dimensional Domains", Soviet Mathematics 33, No. 4, 1-12 (1989).
- [10] Avkhadiev, F. G., Kayumov, I. R. "Admissible Functionals and Infinite-Valent Functions", Complex Variables 18, No. 1, 35-45 (1999).
- [11] Hernandez, R., Martin, M. J. "Pre-Schwarzian and Schwarzian Derivatives of Harmonic Mappings", J. Geom. Anal. 25, No. 1, 64-91 (2015).
- [12] Chen, Sh. L., Ponnusamy, S., Rasila, A., Wang, X. T. "Linear Connectivity, Schwarz-Pick Lemma and Univalence Criteria for Planar Harmonic Mapping", Acta Mathematica Sinica, English Series 32, No. 3, 297-308 (2016).
- [13] Avkhadiev, F. G. "The Minkowski Functional over Ranges of Values of the Logarithm of the Derivative, and Univalence Conditions", Trudy Semin. po Kraev. Zadacham, No. 27, 3-21 (1992) [in Russian].
- [14] Duren, P. L., Shapiro, M. S., Shields, A. L. "Singular Measures and Domains not of Smirnov Type", Duke Math. J. 33, No. 2, 247-254 (1966).

- [15] Avkhadiev, F. G. "Über Bedingungen der Schlichtheit analytischer Funktionen", *Izv. Vyss. Uchebn. Zaved. Mat.*, No. 11, 3–13 (1970) [in Russian].
- [16] Avkhadiev, F. G. "On Sufficient Conditions for Univalence of Solutions of Inverse Boundary-Value Problems", *Sov.Math.Dokl.* 11, 109–112 (1970).
- [17] Avkhadiev, F. G. *Conformal Mapping and Boundary-Value Problems*, Monographs on Mathematics (Kazan fund "Matematika", Kazan, 1996) [in Russian].
- [18] Gevirtz, J. "An Upper Bound for the John Constant", *Proc. Amer.Math. Soc.* 83, No. 3, 476–478 (1981).
- [19] Goluzin, G. M. *Geometric Theory of Functions of a Complex Variable*, Translations of Mathematical Monographs (AmericanMathematical Society, Providence, R. I., 1969), Vol. 26.
- [20] Avkhadiev, F. G., Wirths, K.-J. *Schwarz-Pick Type Inequalities* (Birkhäuser, Boston-Berlin-Bern, 2009).